**Alpha Decay**

Alpha decay is a type of radioactive decay in which an atomic nucleus emits an alpha particle, which consists of two neutrons and two protons. The emission of an alpha particle will cause an atom to decay into an entirely new atom, one that has a mass number four less than the parent molecule and also has an atomic number two less. The general formula for an alpha decay reaction is:

Where X is the mass number, Y is the atomic number, P is the parent nucleus and D is the daughter nucleus. The symbol α in the alpha decay reaction represents an alpha particle.

Alpha particles have a relatively large mass and a relatively low velocity. Also, alpha particles also very likely to react with other particles, meaning they can only travel in a few centimetres of air before being stopped.

**History**

In 1899, Rutherford classified three different types of radiation: alpha, beta and gamma radiation. It was in this year that Rutherford first described an alpha particle. In 1907, Rutherford proved that an alpha particle was in fact a helium-4 nucleus. Rutherford would later use alpha particles to disprove the Plum Pudding Model of an atom through the gold foil experiment.

**Uses**

Alpha particles are most commonly used in fire alarms in which Americium-241 releases alpha particles. The alpha particles ionize the air between a small gap and a current is passed through this gap. Smoke particles that enter the gap reduce the flow of the current, which sounds the alarm.

Alpha decay can also be used to provide a relatively safe power source for Radioisotope Thermoelectric Generators. This is because alpha radiation is significantly less dangerous than beta and gamma radiation. However, the low penetration rate of alpha radiation renders it useless for radiation treatment.